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ART. I.—*On the Use of Bebeerine and Cinchonia in the Treatment of Intermittent Fever.* By WM. PEPPER, M. D., one of the Physicians of the Pennsylvania Hospital.

THE high price of quinia, and the apprehension in the minds of some lest the supply of this important preparation might ultimately fail to meet the increasing demand, have naturally induced medical men to investigate the antiperiodic or febrifuge properties of other remedies. Arsenic, copper, zinc, and iron; as also dogwood, willow, oak, and numerous other tonics, have from time to time been used with more or less success in intermittent fever; but, with the exception of the first named, most of the remedies have been in a great measure abandoned in the treatment of this disease.

Quite recently, the attention of the profession has been directed to the sulphate of bebeerine as being possessed of very decided tonic and antiperiodic power. This remedy was first introduced into general notice by Dr. Rodie, of the British Navy, and was afterwards more fully investigated by Dr. MacLagan, of Edinburgh. He found the sulphate possessed of considerable febrifuge power, scarcely inferior to the same salt of quinia, and in some respects even preferable to it; thus it is reported to be less stimulating, and not so prone to produce headache, singing in the ears, or deafness. By some it has even been asserted that relapses are less frequent after its use than after the sulphate of quinia. From these flattering accounts, I was induced, during the month of June last, to administer this remedy in four of the cases of intermittent fever reported below (Cases XIV., XV., XVI., and XVII). By referring to these cases, it will be perceived that in two of them it proved promptly successful, whilst in the remaining two it entirely failed, and had to be abandoned. In one instance, the patient relapsed at the end of one week, and although the bebeerine was again freely administered, it only tended to mitigate

or modify the disease. It certainly did not appear to produce headache, tinnitus aurium, or acceleration of the pulse; in one case, however, when given in large doses, it provoked vomiting. The bebeerine, though less bitter than quinia, is more nauseous, and therefore more liable to be rejected in cases where the stomach is delicate. Judging from the limited number of cases in which I have seen this remedy used, it appears to be less efficacious than the sulphate of cinchonia or quinia, though at the same time it must be admitted to possess very decided febrifuge powers, and may, perhaps, be well adapted for many of those cases where constitutional peculiarities render the preparations of bark objectionable. Dr. Patterson, in the *Medical Examiner* for May, 1852, has reported two cases of obstinate intermittent, in which the bebeerine effected a permanent cure after the failure of quinia. In Demerara, a decoction of the nut is the common remedy for this disease, and is said to be most generally successful. Notwithstanding these favourable reports, however, it is evident that a more extended observation is still necessary to establish fully the true value of this new remedy.

The more immediate object of the present communication, however, has been to invite the attention of the profession in this country to the undoubted efficacy of sulphate of cinchonia in the treatment of intermittent fevers. Hitherto, this important alkaline principle appears to have been thrown aside as possessing little or no value, or used by the more dishonest, simply for the adulteration of quinia; and this erroneous impression, as to the comparative inefficacy of cinchonia, probably originated in the fact that quinia was first fairly tried in the treatment of intermittent fevers, and having proved highly efficient in this disease, it naturally disinclined medical men to a full investigation of the medical properties of the remaining alkaline principle contained in bark. Unfortunately, too, the first essay with cinchonia did not fully realize the expectations of the observer, and its further use was, therefore, for the time being, prematurely abandoned. In 1821, and soon after it had been fully discovered, by the labours of Pelletier and Caventou, that the febrifuge property of bark depended upon the presence both of quinia and cinchonia, a series of experiments were instituted by Chomel, with the view of ascertaining the comparative merits of these different substances in the treatment of intermittent fever. In his report to the Academy of Sciences, in Paris, he alludes to numerous instances in which the sulphate of quinia proved perfectly successful, but only refers to a single case as having been treated with the sulphate of cinchonia. This patient had been suffering with the disease for two months, in the quotidian form, and also had great enlargement of the spleen; at first, only six grains of the cinchonia were administered during the apyrexia; but, as this failed to check the disease, on the following day twenty grains were administered, with the effect of completely arresting the paroxysms. Upon reducing the dose, however, it appears that the patient soon relapsed, and was not permanently cured until twenty-four grains were given during the intermission. When we bear in mind that the above case

had been of long duration, and was complicated with visceral enlargement, it is by no means surprising that the disease was not checked by small doses of cinchonia at the first effort, or that it should even have recurred after it had once been arrested by larger doses; for, under similar circumstances, it is well known that the same difficulties will often occur under the use of quinia, or any other treatment that may be instituted. And yet there is good reason to believe that the partial want of success in this single instance has had much to do in establishing the common opinion that cinchonia is less energetic than quinia, and consequently requires to be given in a stronger dose.

A more thorough and impartial trial of this important remedy was, however, made by Dr. Bally, in 1825. He gave the sulphate in twenty-seven cases of intermittent fever; and, although only six or eight grains were administered during the intermissions, he succeeded in promptly checking twenty-five of the cases, sixteen of which were of the tertian, and nine of the quotidian type, the average duration of the treatment being only four days. The remaining two cases were quartans, and these were checked quite as promptly as this most obstinate form generally is, by quinia or any other therapeutic agent; in one instance the disease lasted only two days, and in the other it was permanently checked by the end of one week. From these observations, the above-named author concluded that the sulphate of cinchonia arrested acute paroxysmal affections with great promptitude, and that but a moderate dose was necessary for this result; he also inferred that it was less irritating, and that it might, therefore, be more generally administered than the same salt of quinia; he was even disposed to ascribe many of the cures usually attributed to this last-named substance to the well-known fact that it was no uncommon thing to adulterate quinia with cinchonia. In the *Dictionnaire Universel de Matière Médicale*, par Méral et De Lens, allusion is made to numerous instances in which the cinchonia had been successfully used by French and Italian physicians; amongst these may be mentioned Dufour, Petroz, Potier, Mariani, and Bleyne; by all of whom it was fully shown that cinchonia was at least as efficacious as quinia. In confirmation of the same views, we also find it stated, in *Christison's Dispensatory*, that "prejudice, together with the unquestionable energy of quinia as a remedy, has led to the other alkaloid, cinchonia, being overlooked in practice. The equally strong prepossessions, however, which were long entertained in favour of crown bark as a febrifuge and stomachic, though it contains but little quinia, or perhaps none at all, and the proofs which have been given of the great efficacy of the gray, or Huanuco bark, would justify the inference that cinchonia, too, is eminently active. Accordingly, trials made with it by Dr. Bardsley, in England, as well as various practitioners of credit in France, Germany, and Italy, seem to leave little doubt that it is scarcely inferior to quinia in the treatment of intermittent, and some continental writers even maintain that, while equally energetic, it is likewise even less likely to dis-

order the stomach in large doses." In like manner, in the *United States Dispensatory*, Dr. Wood states: "There is little doubt, however, that *cinchonia* possesses febrifuge properties little, if at all, inferior to those of quinia; and should the source of the latter begin to fail, the pale bark would come into more extensive use for the preparation of the former."

In fifteen of the cases reported below, the *cinchonia* was administered with the most signal success, and fully confirmed the above statements as to its efficacy. In a majority of these, the disease had been of many months' duration, and was attended with enlargement of the spleen, and more or less impairment of the general health; yet, notwithstanding these serious difficulties, it was promptly checked at the first effort in eleven of the cases, and in two of these (XIV. and XVI.), the *bebeerine* had first been unsuccessfully tried. In only two instances (XII. and XIII.), was it necessary to administer the *cinchonia* a second time for the arrest of the paroxysms; and of the whole number, as far as it could be ascertained, but two relapsed (I. and V.), and these were promptly and permanently checked by again resorting to the *cinchonia* in full doses. In many of these cases, the quinia had been previously used with only temporary relief; but as no accurate account could be obtained from the patients either as to the doses or exact circumstances under which it had been administered, but little importance can be attached to this fact in estimating the comparative value of these two remedies. Judging from my experience in former seasons in similar cases, I am fully convinced that the *cinchonia* proved quite as efficacious as quinia, and occasionally, indeed, it appeared to be even more prompt. In no instance, that I am aware of, did it produce vomiting or other indications of gastric irritation; but when given in large doses, it gave rise to the same fulness of head as follows the use of quinia. In all the cases, the sulphate of *cinchonia* was given in solution with the addition of a few drops of sulphuric acid; my first impression was that it was more soluble than the same salt of quinia, but a more careful examination convinced me that such was not the case. In taste, the two salts appeared closely to resemble each other, but the *cinchonia* is, perhaps, the least bitter. It is to be regretted that, in some of the cases of intermittent fever, now about to be reported, the *cinchonia* had not been administered in smaller doses, with the view of ascertaining the minimum quantity by which the disease could be arrested; having found, however, that in most instances of inveterate ague, at least sixteen grains of quinia were necessary to insure success, I was also induced to give this amount of *cinchonia* during the apyrexia in every case. In a previous part of this communication, it was stated that the same success had been obtained by Dr. Bally, from the use of only six or eight grains during the intermission; and should these results be confirmed by future observation, they will go far to show that *cinchonia* is not only equal to, but absolutely more potent than quinia. In several cases of neuralgia and intermittent fever which have fallen under my observation in private practice, the *cinchonia* has succeeded after the failure of quinia in similar doses; but we

should be careful how we adopt this result as conclusive evidence of the superiority of the former remedy, since it is by no means improbable that the system may have been already more or less favourably impressed by the previous use of the quinia; and it is for this reason that I am not even disposed to attach too much importance to the two instances above referred to, in which the cinchonia proved promptly successful after the failure of the sulphate of bebeerine in large doses.

From the very full and satisfactory manner in which this subject has been investigated by previous observers, the present report may, by some, be considered as a work of supererogation. But when we bear in mind that this remedy has scarcely been used in our country, and that, notwithstanding the above statements, many are still disposed to doubt its febrifuge power, it has appeared to the writer a matter of some importance that the attention of the profession should once more be invited to this subject. Not only is cinchonia an efficient remedy, but it derives additional importance from the fact that, at the present time, it can be supplied at far less than half the price of quinia. The poor are now in a measure debarred from the use of this last-named remedy, owing to its high cost; but this evil could, in a great degree, be obviated by the general introduction of cinchonia. The immediate effect would be a reduction in the price of quinia; but at the same time it is evident that the increased demand for cinchonia, would necessarily enhance the value of this remedy—though it is hardly probable that either of these alkaloids would at any future time again command the high price now asked for quinia.

CASE I.—C. W., seaman, aged thirty-three years, entered the hospital on the 12th of March, suffering with intermittent fever. From his statement, it appears he had contracted his disease at Chagres last September, from which time, up to the present, he has had repeated attacks in the tertian form. His present attack commenced about five days before his admission, and had now assumed the quotidian type, the paroxysm commencing generally between the hours of ten and twelve in the morning. The spleen was much enlarged, skin slightly icterode, and, at the same time, he was exceedingly anemic.

Two grains of the sulphate of cinchonia were administered in the evening, and the same dose was to be repeated the following morning every two hours until he had taken sixteen grains. On the 13th, however, the chill commenced much earlier than usual, and before the patient had taken a second dose, so that the medicine had to be discontinued. By midday, the fever had subsided, and the cinchonia was resumed, one grain every hour to the above-named amount. From this time up to the 24th he had no return of the disease, and, during this period, he used two grains of the cinchonia with five of Vallet's carbonate of iron three times a day; strong iodine ointment was also applied over the spleen. During the afternoon of this day, he experienced a slight chilly sensation followed by considerable perspiration; from this time he remained well, up to April 5th, when he again had the same train of symptoms, and these continued to recur for several consecutive days at about 11 A. M.

Thursday, April 7, or just four weeks from the time of his admission, he had a decided chill, followed by fever and perspiration; accordingly, on the

following morning at 6 o'clock, he commenced taking two grains of cinchonia to be continued for eight consecutive hours. From this time, he had no return of his chill, but, as a precautionary measure, two grains of the cinchonia, and five of pil. carb. ferri. were continued three times a day, during his stay in the house. He left the institution on the 12th, apparently perfectly well, his colour having greatly improved, and the spleen being reduced to nearly its natural dimensions.

In the above case, it will be perceived that, although the disease was promptly arrested by the administration of sixteen grains of cinchonia, it returned ten days after in an exceedingly mild and modified form; this was again followed by an interval of the same duration, but the paroxysms were not permanently checked until sixteen grains were once more given during the apyrexia. When, however, we consider the long duration of the disease, the patient's anæmic condition, and the great enlargement of the spleen, which complicated the case, there is certainly no reason to be dissatisfied with the effects of the remedy. A more successful result could not probably have been attained from quinia under existing circumstances.

CASE II.—J. D., seaman, aged twenty-three, entered hospital April 17, labouring under quotidian fever of two months' duration, states that he contracted the disease at Chagres, and that he had upon several occasions taken quinia without relief; he could not, however, specify the exact amount of this medicine which had been administered. His skin was now sallow, lips pale, and the spleen much enlarged and painful on pressure. Upon the day of his admission he had a severe chill, followed by fever, lasting five hours, and ending in copious perspiration. The paroxysm commenced at about ten in the morning, and the same evening he took sulph. cinchonæ grs. ii, every two hours, for four consecutive doses; the same treatment was resumed early on the morning of the following day, until he had taken in all grs. xvj. From this time he had no return of the disease, and was now directed to take five grains of Vallet's ferruginous mass with two grains of the cinchonia three times a day. Under this treatment his complexion rapidly improved; by the 10th of the following month, the spleen was reduced to its natural size, and he now left the hospital apparently in perfect health.

In this instance, the cinchonia was so signally efficacious that further comment is unnecessary.

CASE III.—R. C., seaman, aged thirty-five, entered the hospital on the 10th of March; stated that he had contracted intermittent fever at Mobile, and that he had now been suffering with this disease in the tertian form for the last two months, the paroxysms generally commencing about 11 A. M. On the day of his admission, he had a severe and protracted chill at about seven in the morning, followed by high fever and ending in copious perspiration. On the 21st, the paroxysm commenced about 4 A. M., and it was, therefore, deemed expedient in anticipation of the next attack to commence with the cinchonia on the following morning; two grains to be administered every two hours until he should have taken, in all, sixteen.

On the 23d, the day of the expected paroxysm, the patient remained perfectly well, and so continued up to the 9th of the following month, April, when he left the hospital to all appearances in full health. After the arrest

of the paroxysms, as in the former cases, he was kept steadily upon the use of cinchonia and Vallet's carbonate of iron, two grains of the former and five of the latter, three times a day.

In this instance, the disease had been of short duration, and, being untended by any enlargement of the spleen, or serious disorder of health, was, of course, more amenable to treatment.

CASE IV.—M. D., labourer, aged thirty, admitted April 17, for intermittent fever of the quotidian type. He contracted the disease about eighteen months ago in the State of New Jersey; during the past winter, however, he had been free from it, and it only reappeared about one week before his admission, the paroxysms coming on daily about 8 A. M. His complexion was a little sallow, but no enlargement of the spleen could be detected, nor had his general health suffered much. On the evening of the 17th, he took grs. ij of sulph. cinchonia every two hours for four consecutive doses, and this same plan was pursued the following day, so that, by ten o'clock on the morning of the 18th, he had taken, in all, grs. xvi.

From this time he remained perfectly well, but to guard against a relapse, he was directed two grains of cinchonia with five of the iron three times a day during his stay in the house. By request, he left the institution on the 27th of the same month in excellent health.

CASE V.—E. M., a young woman, aged twenty-five, entered the hospital April 26th, suffering with intermittent fever, stated that she had been residing in the city for the last eighteen months, and that upon no previous occasion had she been subject to ague; her present attack was only of four days' duration, the paroxysms generally coming on in the forenoon. No visceral enlargement could be detected, nor was her constitution materially impaired, though, at the same time, she was naturally nervous and more or less pallid. On the day after her admission, the chill recurred as usual, and she was accordingly directed to take grs. ij sulph. cinchonia every two hours, commencing at 2 P. M., and continuing the treatment up to bedtime; the following morning, April 28th, the same plan was to be pursued until, in all, grs. xvi had been taken. From this date, she had no return of the disease; but, during her stay in the house, she took, three times a day, grs. ii of sulph. cinchonia, and grs. v of pil. ferri. carb. On the 16th of May, or about three weeks after her admission, she was discharged perfectly well.

She was readmitted May 24th, and stated that the disease had returned on the third day after her discharge, and had now assumed the tertian form; the paroxysms commencing about 5 A. M. Her bowels being constipated, five grains of blue pill were directed in the evening, to be followed in the morning by a Seidlitz powder; on the 26th and 28th, the chill commenced at about the hour above indicated, no antiperiodic having been administered up to this time. On the evening of the 29th, she took eight grains of the cinchonia before bedtime in two-grain doses, and at an interval of two hours; on the following morning, eight grains more were in like manner administered in anticipation of the expected paroxysm. There was, however, no return of the disease up to 13th of June, about which time she left the institution apparently perfectly well. It should also be stated that, from the time of the last paroxysm up to the period of her discharge, the sulph. cinchonia and iron were continued in small doses three times a day, as in the former cases.

It has long been remarked by careful observers that there is a tendency in

intermittent fever, when checked by whatever means, to recur on the fourteenth or twenty-first day after the last paroxysm; in the above case, it will be perceived that a relapse took place two or three days after leaving the hospital, or just three weeks from the occurrence of the last attack, and was, most probably, owing to some indiscretion on the part of the patient.

CASE VI.—J. L., seaman, entered the hospital April 17, for intermittent fever; stated that he had contracted the disease in North Carolina last autumn, and that it then persisted for eight weeks, but had not recurred during the past winter. The first paroxysm this spring occurred two days previous to his admission, and was renewed on the 17th and 19th; on the evening of the 21st, eight grains of sulph. cinchonia were administered, and the same amount on the following morning before nine o'clock. By this treatment, the disease was promptly checked, and did not return up to April 27th, when he left the hospital perfectly well. During his stay in the house, however, he was kept under the use of sulph. cinchonia grs. ii, and pil. carb. ferri three times a day. It may also be important to state that in this case there was no enlargement of the spleen, or any serious constitutional disturbance. As he had left the institution rather prematurely, he was requested to return in case of relapse; but not having been heard of up to the end of June, the presumption is that the cure was permanent.

CASE VII.—J. W., labourer, admitted May 8, for intermittent fever, under which he had been suffering since last July. During the winter, the attacks were irregular, both in form and duration; but, for four days previous to admission, the paroxysms had come on every afternoon, preceded, however, with but slight chilliness. Upon several occasions he had used quinia with temporary relief, but his health was now much impaired; lips pallid; skin slightly icterode; spleen greatly enlarged.

On the 9th, about 4 P. M., he was seized with a severe chill followed by high fever, and ending in profuse perspiration; during the same evening and following morning, sixteen grains of sulph. cinchonia were used, grs. ii being given every two hours.

On the 11th, he escaped his chill, and continued perfectly well up to May 27; by this time, his colour was restored; the spleen had regained its natural dimensions, and, in fact, his health appeared fully re-established. He was, accordingly, discharged, with the full understanding that the sulph. cinchonia, grs. ii, and pil. carb. ferri, which he had been taking three times a day since in the house, should still be continued for some days; he was also requested to return in case of relapse, but as nothing was heard from him up to the end of June, it is highly probable that the cure was permanent.

CASE VIII.—H. B., labourer, aged twenty-five, admitted on the 18th of May, for intermittent fever; he stated that, for the last four days, he had been subject to irregular chills and fevers; the skin was not icterode, nor was there any enlargement of the spleen. At the time of his admission, he was suffering with fever, for which he took the neutral mixture; on the following day, however, he appeared perfectly well. On the 20th (two days after admission), he had a severe chill about 7 A. M., and, in the course of the same day, another paroxysm, but much milder than the first. On the following day, there was no return of the disease, but, on the 22d, or fourth day after admission, he had a heavy chill about daylight, and another, equally severe, three hours after, followed by high fever and copious perspiration.

23d. Being free from fever to-day, he commenced with the sulphate of cinchonia at 3 P. M., and took two grains every hour up to ten at night. After this, there was no return, and, as usual, he was directed two grains of cinchonia with five of iron three times a day. On the 28th, he was discharged on account of the crowded condition of the wards, but was particularly charged to continue the above treatment for two weeks, and, at the end of this time, to return and report his condition. Accordingly, he came to the hospital on the 8th of June, and stated that he had remained perfectly well since leaving the institution.

From the confused account given by the patient of his previous symptoms, it at first was no easy matter to decide upon the type of his disease; as, however, he had two distinct chills upon alternate days, it became evident that he was labouring under a *duplicated or doubled tertian*.

CASE IX.—D. B., labourer, entered the hospital April 21; stated that he contracted the disease last autumn in Maryland, and that he suffered repeated attacks of intermittent fever in the tertian form during the past winter; seven days previous to his admission, however, the paroxysms came on every evening. The spleen was perceptibly enlarged, and his countenance was pallid and somewhat sallow.

On the 22d and 23d, he had a severe chill about 8 P. M.; and, accordingly, on the following day, 24th, he took cinchonia sulphat. grs. ii every hour from 3 P. M. to 7 P. M. He had no further attack from this date, and under the use of small doses of cinchonia and iron, soon regained a healthy appearance, whilst at the same time the spleen was rapidly reduced in size.

Owing to the crowded state of the wards, he was obliged to leave on the 28th of same month; he, however, was supplied with iron and cinchonia sufficient for two weeks, with the full understanding that he should return in case of relapse. Not having heard from the patient up to the end of June, it is highly probable that his recovery was permanent. It is worthy of remark, in connection with this case, that the disease, though of long duration, and attended with considerable disorder of health, and much enlargement of the spleen, was, nevertheless, promptly checked by *ten grains* of the sulphate of cinchonia.

CASE X.—W. J., seaman, admitted May 29, for intermittent fever. The disease was contracted last summer at New Orleans; he there had it in the tertian form for four or five weeks, and it again returned in the autumn; but during the winter, though not well, he had no decided chill or paroxysm. This spring it returned towards the end of April, and has since recurred every other day in the morning, between the hours of eleven and twelve. At the time of his admission the skin was slightly icterode, and the spleen somewhat enlarged.

On the day after his admission the chill came on as usual at about 12 M.; and, accordingly, in anticipation of the next paroxysm, on the 1st of June he was directed two grains of the sulphate of cinchonia every hour from 4 A. M. to 11 A. M. There being no return of the disease, from this date he was ordered two grains of the cinchonia and five of the iron three times a day; this treatment was continued for two weeks, when he left the institution apparently in full health.

CASE XI.—J. W., German labourer, entered the hospital, May 28, for intermittent fever. He contracted the disease last August in New Jersey, but had no return until the end of March ensuing; since then, however, the

paroxysms have come on daily at about 2 P. M. At the time of admission, his face was pallid and bloated, and the spleen greatly enlarged.

On the day of admission he had a severe chill at 7 P. M.; and, on the following day, it came on at the usual hour, about 2 P. M. On the 30th, he commenced with two grains of sulph. cinchonia every hour from 6 A. M. to 2 P. M. inclusive; but it failed to check the disease, and the chill came on as usual soon after taking the last dose. On the 31st, he took the same quantities at the same hours, and from this time had no further return. During his stay in the house, strong iodine ointment was freely applied over the region of the spleen, and, at the same time, two grains of the cinchonia and five of iron were regularly administered three times a day. On the 12th of the month following, June, he left the institution greatly improved in health; the spleen also having nearly regained its natural size.

CASE XII.—A. K., labourer, aged twenty-one, entered on the 2d of June, for intermittent fever. He had been suffering with the disease for one month, at first in the quotidian, and then in the tertian form. At time of admission he was pale and sallow, and had considerable enlargement of the spleen, which was also tender on pressure.

On the day following, he had a severe chill in the course of the morning, and accordingly on the 4th he commenced with the cinchonia, taking two grains at 6 P. M., and the same dose at bedtime; on the following morning the same treatment was resumed at 4 A. M., and continued every hour up to 9 A. M., making in all sixteen grains.

Soon after the last dose had been administered, however, the chill came on and was followed by fever, which lasted until evening. June 6, being his well day, he took but six grains of the cinchonia in the course of the twenty-four hours. In anticipation of the paroxysm on the 7th, it was determined to give the cinchonia in larger doses, and nearer to the usual time of the paroxysm; accordingly, he took four grains at five, six, eight, and nine o'clock in the morning. From this time the disease was checked, and did not return up to the 10th, when he left the hospital much improved in health, the spleen also being reduced to its natural size.

CASE XIII.—J. W., seaman, aged twenty-six, admitted June 18, for intermittent fever. The disease had been contracted at New Orleans, in the early part of this month; he then had a paroxysm for four or five consecutive days, which speedily yielded to sulphate of quinia, and did not again recur until the 25th, or about one week after entering the hospital. At the time of admission, there was some sallowness of skin, and slight enlargement of the spleen; the patient also suffered with great prostration, and it was especially for this distressing symptom that he sought medical aid. He was accordingly directed full diet and a bottle of porter; also two drachms of the compound tincture of gentian three times a day.

About 1 P. M., on the 25th, as above stated, he had a severe chill followed by fever and perspiration; on the following day, sixteen grains of the sulphate of cinchonia were prescribed in two-grain doses in anticipation of an expected paroxysm. At 3 P. M., however, the chill returned with equal violence.

On the 27th, he again took the same amount of cinchonia, commencing about 8 A. M., and taking two grains every hour up to 3 P. M. The cinchonia this time proved perfectly successful, and there was no further return of the disease up to July 9, when he left the hospital apparently in perfect

health. During his stay in the house, the cinchonia and iron were daily administered in two and five grain doses as in all the previous cases.

It is to be regretted that in this, as well as in several of the other cases above reported, the patients could not be kept sufficiently long under observation to ascertain fully the durability of the cure. In every instance, however, where the discharge took place within two or three weeks after an arrest of the paroxysms, strict injunctions were given to return in case of relapse; and as nothing to the contrary was heard from these patients, it is fair to conclude that the cures were most probably more or less permanent.

In the four following cases, the bebeerine was given in place of the cinchonia, with the view of testing their comparative merits in the treatment of intermittent fever.

CASE XIV.—J. H., seamstress, aged nineteen, admitted June 5, had suffered last summer and autumn with intermittent fever, which she contracted whilst residing in New Jersey. The paroxysms had been repeatedly checked by quinia, but invariably returned at the end of a week; during the winter, however, she remained free from them, but did not feel well, and always complained of pain in the region of the spleen. In March, the disease again returned, sometimes assuming the tertian, and at others the quotidian type; under the use of quinia, she again improved, but the disease was not eradicated, and she continued to have her good and bad days up to the time of admission. At this time she was pallid, and had considerable enlargement of the spleen.

June 5, at 9 A. M., she had a severe chill, followed by fever and perspiration; another paroxysm occurred on the 7th, at about midday. In anticipation of the chill on the 9th, two grains of the sulphate of bebeerine were administered at 5 A. M., and to be repeated every hour until she had taken sixteen grains. The paroxysms did not return, and the patient was so well pleased with the result that, contrary to orders, and unknown to the nurse, she continued the medicine in four-grain doses, from 12 M. up to 5 P. M., making in all some forty grains that she had taken in the course of the day. The only effect from the bebeerine in these large doses was sickness of stomach, unattended, however, by headache, giddiness, or ringing in the ear, such as generally follows the use of quinia in similar doses.

Although the bebeerine and iron (two grains of the former and five of the latter) were continued three times a day, the disease recurred on the 13th. Accordingly, on the 15th, the bebeerine was again prescribed every hour, from 5 A. M. up to 12 M. inclusive. Immediately after the last dose, however, the chill came on, and was followed by high fever and severe headache. A paroxysm of equal severity came on at 12 M., on the 17th, showing clearly that the disease was in no manner influenced by the treatment. Accordingly on the 19th, it was determined to substitute the cinchonia in two-grain doses every hour, from 6 A. M. to 10 A. M. inclusive, making in all ten grains, during the apyrexia.

From this time there was no return of the disease up to the 30th, when she left the house in perfect health, having regained her flesh, strength, and colour, and the spleen being reduced to its natural dimensions. As in the former cases, from the time of the arrest of the paroxysms, she had taken, during her stay in the house, two grains of the sulphate of cinchonia, with five grains of Vallet's carbonate of iron, three times a day.

CASE XV.—M. II., domestic, aged twenty-seven, admitted June 8, for intermittent fever, which commenced about one month ago. The disease was then checked by the use of Peruvian bark, but it soon returned, and for two weeks previous to admission she had a paroxysm every day at about 7 P. M. Her general health was not much impaired, but the spleen was somewhat enlarged. On the day of admission, the chill came on as usual in the evening, and accordingly on the following day in anticipation of its return, she took two grains of the sulphate of bebeerine every hour from 11 A. M. to 6 P. M. inclusive. From this time, the disease was checked, and on the following day, two grains of the bebeerine, with five of iron, were given three times a day during her stay in the hospital. She was discharged in full health on the 25th, not having had a return since the 8th. In this instance, the bebeerine did not excite vomiting, as in the former case, but it produced some acceleration of the circulation, the pulse having risen from 78 to 100.

CASE XVI.—H. P., seaman, aged twenty-six, admitted June 9, for intermittent fever. The disease had been contracted at Panama, four months ago, since when it has continued to recur at irregular intervals; upon several occasions, quinia had been taken in large doses, but only with the effect of suspending the paroxysms for a few days. For one week previous to admission, he has had a return every day at about 4 P. M., and was now icterode, and had great enlargement and induration of the spleen.

On the 10th, the bebeerine was ordered in two-grain doses every hour, from 8 A. M. up to 4 P. M.; by this treatment, though the disease was not checked, the paroxysm was postponed until 6 P. M., and was much less severe than on former occasions. On the 11th, the same plan was pursued as on the previous day; this time, however, with the effect of completely arresting the disease for the space of one week, or up to the 19th, when he had a relapse, the paroxysm coming on at about 2 P. M.

Two days after, or on the 21st, the chill returned at about the same hour, showing clearly that the disease had now assumed the tertian type. Up to this time, he had continued the bebeerine and iron (two grains of the former and five of the latter three times a day); as this treatment appeared only to modify the disease without checking it, it was determined to substitute the sulphate of cinchonia as in the former cases. Accordingly on the 23d, two grains of it were administered every hour from 8 A. M. to 1 P. M., making in all only twelve grains. The only result was a postponement of the paroxysm until 4 P. M., or two hours later than the previous chill. The next day, however, the cinchonia was administered in like manner, and from this time there was no return up to July 9, or a period of more than two weeks, since the last attack. He was now discharged at his own request, and left the hospital apparently in perfect health.

CASE XVII.—J. W., seaman, aged twenty-one, admitted June 10, labouring under a paroxysm of intermittent fever. The disease had been contracted last autumn in Savannah, and has continued to recur at irregular intervals up to the present time. The chill generally recurred on alternate days, at about 11 A. M.; his health was much impaired, skin icterode, spleen much enlarged and indurated.

On the 12th, the attack came on at the usual time, and was followed by severe fever, which lasted three hours. In anticipation of the next paroxysm, he was ordered, on the 13th, two grains of the bebeerine every hour from 6 P. M. to 9 P. M., and the same to be resumed on the following morning at

6 A. M. and continued up to 9 A. M., making in all sixteen grains during the apyrexia. From this time there was no return, and under the use of small doses of bebeerine and iron, his health continued gradually to improve; on the 30th, he was discharged, not having had a chill for the last eighteen days, and his spleen being reduced to its natural size.

In conclusion, I would state that the above trials with cinchonia were instituted at the suggestion of Dr. Carson, and that I have been much aided in the undertaking by the valuable notes furnished by Dr. A. Hewson, Resident Physician.

ART. II.—*Medical and Surgical Notes of Campaigns in the War with Mexico, during the years 1845, 1846, 1847, and 1848.* By JOHN B. PORTER, M.D., Surgeon U. S. Army. (Continued from Vol. XXIV. p. 30.)

Treatment of Gunshot Wounds, continued.—When a musket ball has passed through a fleshy part, the wound may be dressed with a little lint, adhesive plaster, and a few turns of a roller, and afterwards the cold-water dressing, or lead lotion, both excellent, may be applied. The cold lead-water poultice, after the wounded are placed in hospital, so light as not to cause pain or uneasiness by its weight, is a good application, and does not require such frequent renewals as the lotion—a consideration, when every hospital attendant has as much duty to perform as he can turn his hand to. In the first part of the treatment, both Guthrie and Hennen strongly advise cold applications; but if they affect the patient unpleasantly or the wound become stiff and painful, warm ones must be substituted; and poultices are the best, as being more durable in their influence than fomentations. When the bone of a limb is injured, and amputation is not considered necessary, much the same treatment is advisable, after removing splinters and foreign bodies. The effect of cold applications should be carefully watched, and the too long continuance of poultices in the subsequent stage avoided. It is never expected that a gunshot wound, however simple, will heal by the first intention; nor is it expected that a wound of this character can, by the use of cold dressings, or by any treatment whatever, be prevented from suppurating to some extent; but great good may be accomplished by cold dressings in the first part of the treatment, by preventing extensive cellular inflammation and consequent profuse suppuration. Suppuration and sloughing are always expected to occur, more or less, in all gunshot wounds, particularly at the entrance and exit of the ball, but it by no means follows that sloughing will inevitably take place in the whole track of the bullet; and a free use of cold dressings may do much to prevent extensive inflammation, deep sloughing, and profuse suppuration. Mr. Guthrie says:—